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ABSTRACT

Research was conducted to determine whether teacher training institutes provide adequate education in map and globe skills and whether prospective teachers are capable of transmitting map and globe skills to students. To test these questions, a total of 495 elementary education majors at the University of Central Florida took the Nystrom Map and Globe Skills Diagnostic Test between 1979 and 1983. Tests were conducted in the fall and spring of each academic year on those students currently enrolled in the second of three public school internships. Data were compiled yearly and then processed comprehensively. In addition, 29 secondary education majors took the test in spring 1983 and their results were compared to a randomly selected class of elementary education majors. Findings indicated that the average education major tested had a C level understanding of tested skills. Major weaknesses in 6 of 23 areas, including the ability to identify source and direction of rivers, compare climates on the basis of latitude and elevation, and discriminate between maps and globes for determining size, shape, distance, and direction, suggest the need to reform social studies method courses for preservice and inservice teachers. Tables illustrate major question areas missed by test groups. (LP)

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RESEARCH REPORT ON ELEMENTARY AND SECONDARY TEACHERS' COMPETENCIES IN MAP AND GLOBE SKILLS

by:

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RATIONALE. An element that has long been common to social studies instruction is the teaching of map and globe skills. Acquisition of these study skills is important if students are to be able to interpret the symbolic representations of the earth or sections of the earth in order to better understand the geographic nature of the world in which they live. Through the use of maps and globes, students can also be led into a more complete understanding of historical events, scientific concepts about the earth, and sociological and economic relationships between people of the world. Furthermore, a thorough proficiency in map and globe skills is necessary to students, not only as they continue in their education, but perhaps, more importantly, as they become citizens of this vast and complicated world in which they will work, travel, make important decisions, and live out their lives.

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Granted, then, that the study of map and globe skills should be a vital part of every student's education. But what are the implications for teachers who must teach these skills?

STATEMENT OF PROBLEM. We need to know if prospective elementary school teachers are knowledgeable in the area of map and globe skills for three very important reasons. First, many states require that prospective teachers pass assessment tests in order to receive their teaching certificates. Questions about map and globe skills are usually included in these tests. Do teacher training institutes provide enough knowledge and practice in these important study skills to enable prospective teachers to pass this portion of the assessment without difficulty?

Second, at the present time most map and globe skills are taught in the elementary schools. Thereafter, students are expected to be well-versed in these skills, and instruction in them is usually incidental and cursory. Are elementary school teachers knowledgeable enough about map and globe skills to be able to pass this necessary knowledge along to their students by the time they finish the sixth grade?

Finally, if prospective teachers do have weaknesses in their understanding of map and globe skills it is important that teacher training programs know what these weaknesses are in order that the teachers might be better prepared in light of their deficiencies.

METHODOLOGY. In an attempt to answer these important questions, the present study was conducted at the University of Central Florida. The purpose of the study was to determine if student teachers have weaknesses in the area of map and globe study skills, and if so, to determine what those weaknesses might be. It was felt that a knowledge of possible weaknesses would have implications for changing the Social Studies methods courses for prospective teachers.

The sample population consisted of four hundred ninety-five elementary education majors, and a small sample of twenty-nine secondary education majors, with the majority being in their junior year at college. All students were enrolled in the second of three internship experiences in the public elementary schools. The students attend their assigned schools four mornings each week for ten weeks, at which time they must teach one unit in Social Studies, as well as other assigned units. During these same afternoons, students attend classes at the University, one of which is a Social Studies class.

During each academic year from 1979 to 1983, elementary students in twenty-two sections of the above-mentioned Social Studies classes were given the Nystrom "Map and Globe Skills Diagnostic Test," a criterion-referenced test devised by Daniel R. Marken and Paul Bushue of Seattle, Washington. Classes were tested at the beginning of the Fall or Spring semesters.

In addition, a group of secondary student teachers was tested at the beginning of the 1983 Spring semester, and compared against a randomly selected class of elementary students from the same term. Data was compiled year by year, allowing a comparison to be made between skills acquired in different yearly ranges. Furthermore, information was processed comprehensively, providing overall profiles of the map and globe skills of the elementary student teacher.

The Nystrom instrument consists of sixty-nine questions which are arranged in twenty-three clusters according to the types of skills to be attained. Remedial lessons called "Where and Why?" can be obtained from the authors. These contain instruction in various activities designed to enhance knowledge in the skill clusters in which the students evidence weaknesses. All answers were machine graded and analyzed using standard computer grading software.

ANALYSIS OF RESULTS. For the test, the mean raw scores, or the average number of correct answers, were weighted according to the number of students in each class. The resultant weighted mean score for the four hundred ninety-five students taking the test was 55.71. Therefore, the average student answered 55 out of the 69 questions correctly, or about 79 percent. In most tests given at the college level, the grade given to a score of 79 is usually a C. This would seem to indicate that most of our prospective teachers, at least those at the University in Florida, are C students when it comes to map and globe skills.

The next step was to determine which clusters of skills seemed to be the most difficult for students on this first testing. For purposes of comparison, it was determined that a 50% incidence of failure on skill area questions would indicate a strong weakness in that particular skill. Of the 69 items, seven were missed by more than 50% of the sample population. Five more were missed by between 40-50% of the sample. Figures 1 and 2 show the test items most frequently missed on the pretest, the skills the items tested for, and the rank order, with the most frequently missed item at the top.

As can be seen from Figure 1, the most difficult skill pertaining to map and globe study for these students was to discriminate between a world map and a globe for determining shape and size, and for finding distances and direction. In other words, these students did not seem to understand the relative merits of a world map as compared to a globe, and they did not seem to know which could more effectively be used for determining sizes of continents, or distances from on point in the world to another.

The next most difficult tasks involved identifying the mouth and source of a river on a map, differentiating between upstream and downstream, and using contours to determine the direction of flow. All four test items pertaining to these skills were missed by a majority of students.

The third area of weakness determined by this study involved comparing the climates of selected cities on the basis of differences in latitude and elevation.

Figure 2 reinforces the finding of Figure 1, in that questions pertaining to latitude and longitude continue to show up as areas of weakness, although these questions were missed by a little less than 50% of the sample. Problems in understanding the identification of the earth's tilt as the cause of seasonal changes, as well as understanding the results of the earth's revolution, rotation, and tilt also continue to be a problem of the sample population. The final area of weakness that shows up between 40-50% of the sample population is identifying and using a map legend to determine meanings of selected symbols, particularly state or provincial boundaries.

CONCLUSIONS. What are the implications of this study? The data indicate that the average elementary education major in the sample studied does not have a complete grasp of knowledge about map and globe skills, and in fact, shows major weaknesses in six of the twenty-three skill areas that are tested on the Nystrom instrument. This might be due to shortcomings in the early education programs. Whatever the cause, it seems likely that we must increase the proficiency of teachers in training regarding map and globe skills if indeed, they are to be more able to provide activities and experiences for their students which will enhance the necessary map and globe skills. This teacher education should focus on the six above-mentioned skill areas, and could take place at both the pre-service and inservice levels. At the preservice level, perhaps it could take the form of a geography course for education majors, whereas inservice training might consist of a condensed course of map and globe skills.

If offering a new geography course at the preservice level is not

a possibility, perhaps the present study can serve as a model for a viable alternative. At the beginning of a required social studies course for education majors, the Nystrom instrument, or one like it, can be administered to students. Remediation in the skills areas in which students are weak can then be a requirement of the course. At the end of the course, the same test can again be administered, this time counting as a portion of the student's total grade. Perhaps the added incentive of working for a grade would serve to close the gap even further between the map and globe study skills one brings to the course, and those acquired as a result of it.

If we, as educators, feel that a knowledge of map and globe skills is important in this world of rapid communication, global transportation, increased pollution, and ever-changing social, political, and physical boundaries, then we must be certain that our elementary school teachers are adequately prepared to teach them.

TEST ITEM NO.	SKILL	PERCENTAGES OF STUDENTS MISSING ITEM	RANK ORDER
31	DISCRIMINATE BETWEEN WORLD MAPS AND GLOBES FOR DETERMINING SHAPE AND SIZE	82.6	1
32	DISCRIMINATE BETWEEN A WORLD MAP AND GLOBE FOR FINDING DISTANCES AND DIRECTION	76.8	2
49	IDENTIFY THE SOURCE OF A RIVER ON A MAP	64.2	3
46	USE CONTOURS OF A MAP TO DETERMINE DIRECTION OF FLOW OF A RIVER	63.2	4
47	DIFFERENTIATE BETWEEN UPSTREAM AND DOWNSTREAM OF A RIVER ON A MAP	63.0	5
64	COMPARE THE CLIMATES OF SELECTED CITIES ON THE BASIS OF DIFFERENCES IN LATITUDE AND ELEVATION	62.6	6
48	IDENTIFY THE MOUTH OF A RIVER ON A MAP	60.0	7

FIGURE 1. RANK LISTING OF NYSTROM TEST ITEMS MISSED BY MORE THAN 50% OF THE SAMPLE POPULATION. (COMPREHENSIVE SCORES, 1979-1983) N=495.

TEST ITEM NO.	SKILL	PERCENTAGES OF STUDENTS MISSING ITEM	RANK ORDER
59	IDENTIFY REVOLUTION AND THE EARTH'S TILT AS THE CAUSE OF SEASONAL CHANGES	48.5	8
27	IDENTIFY LINES OF LONGITUDE AND MATCH SYNONYM (MERIDIAN)	47.7	9
25	IDENTIFY LINES OF LATITUDE AND MATCH SYNONYM (PARALLEL)	46.9	10
60	IDENTIFY THE EARTH'S TILT AS THE CAUSE OF SEASONAL CHANGES	42.0	11
51	IDENTIFY AND USE A MAP LEGEND TO DETERMINE THE MEANINGS OF SELECTED SYMBOLS (STATE OR PROVINCIAL BOUNDARIES)	40.2	12

FIGURE 2. RANK LISTING OF NYSTROM TEST ITEMS MISSED BY BETWEEN 40-50% OF THE SAMPLE POPULATION. (COMPREHENSIVE DATA, 1979-1983) N=495.

SECONDARY PRE-SERVICE (STUDENTS) TEACHERS

(N = 29; SPRING, 1983)

TEST ITEM NO.	SKILL	PERCENTAGE OF STUDENTS MISSING ITEM	RANK ORDER
32	DISCRIMINATE BETWEEN A WORLD MAP AND GLOBE FOR FINDING DISTANCES AND DIRECTION	65.5	1
48	IDENTIFY THE MOUTH OF A RIVER ON A MAP	55.2	2
47	DIFFERENTIATE BETWEEN UPSTREAM AND DOWNSTREAM OF A RIVER ON A MAP	41.4	3
49	IDENTIFY THE SOURCE OF A RIVER ON A MAP	37.9	4

FIGURE 8A. RANK LISTING OF NYSTROM TEST ITEMS MISSED BY MORE THAN 40% OF THE SAMPLE POPULATION OF SECONDARY EDUCATION STUDENTS, TESTED DURING SPRING TERM, 1983.

ELEMENTARY RANDOM SAMPLE

(N = 23; SPRING 83)

TEST ITEM NO.	SKILL	% OF STUDENTS MISSING ITEM	RANK ORDER
31	DISCRIMINATE BETWEEN WORLD MAPS AND GLOBES FOR DETERMINING SHAPE AND SIZE	82.1	1
47	DIFFERENTIATE BETWEEN UPSTREAM AND DOWNSTREAM OF A RIVER ON A MAP	71.4	2
32	DISCRIMINATE BETWEEN A WORLD MAP AND GLOBE FOR FINDING DISTANCES AND DIRECTION	67.9	3
46	USE CONTOURS OF A MAP TO DETERMINE DIRECTION OF FLOW OF A RIVER	64.3	4
49	IDENTIFY THE SOURCE OF A RIVER ON A MAP	60.7	5
60	IDENTIFY THE EARTH'S TILT AS THE CAUSE OF SEASONAL CHANGES	46.4	6
59	IDENTIFY REVOLUTION AND THE EARTH'S TILT AS THE CAUSE OF SEASONAL CHANGES	42.9	7

FIGURE 8B. RANK LISTING OF NYSTROM TEST ITEMS MISSED BY MORE THAN 40% OF ELEMENTARY RANDOM SAMPLE POPULATION (N=28; SPRING 1983)

(50% + MISSED)
GRADUATE (INSERVICE) STUDENTS

TEST ITEM NO.	SKILL	PERCENTAGE OF STUDENTS MISSING ITEM	RANK ORDER
32	DISCRIMINATE BETWEEN A WORLD MAP AND GLOBE FOR FINDING DISTANCES AND DIRECTION	79.6	1
31	DISCRIMINATE BETWEEN WORLD MAPS AND GLOBES FOR DETERMINING SHAPE AND SIZE	73.5	2
64	COMPARE THE CLIMATES OF SELECTED CITIES ON THE BASIS OF DIFFERENCES IN LATITUDE AND ELEVATION	61.2	3
48	IDENTIFY THE MOUTH OF A RIVER ON A MAP	55.1	4
51	IDENTIFY AND USE A MAP LEGEND TO DETERMINE THE MEANINGS OF SELECTED SYMBOLS	55.1	5
25	IDENTIFY LINES OF LATITUDE AND MATCH SYNONYM (PARALLEL)	53.0	6
59	IDENTIFY REVOLUTION AND THE EARTH'S TILT AS THE CAUSE OF SEASONAL CHANGES	53.0	7
27	IDENTIFY LINES OF LONGITUDE AND MATCH SYNONYM (MERIDIAN)	51.0	8

FIGURE 9A. RANK LISTING OF NYSTROM TEST ITEMS MISSED BY MORE THAN 50% OF SAMPLE POPULATION OF INSERVICE TEACHERS (N = 49).

GRADUATE (INSERVICE) STUDENTS

(40-50% MISSED)

TEST ITEM NO.	SKILL	PERCENTAGE OF STUDENTS MISSING ITEM	RANK ORDER
46	USE CONTOURS OF A MAP TO DETERMINE DIRECTION OF FLOW OF A RIVER ON A MAP	44.8	9
47	DIFFERENTIATE BETWEEN UPSTREAM AND DOWNSTREAM OF A RIVER ON A MAP	44.8	10
49	IDENTIFY THE SOURCE OF A RIVER ON A MAP	44.8	11
57	IDENTIFY ROTATION AS THE CAUSE OF DAY AND NIGHT	42.8	12
58	IDENTIFY ROTATION AS THE CAUSE OF SUNRISE AND SUNSET	42.8	13

FIGURE 9B. RANK LISTING OF TEST ITEMS MISSED BY BETWEEN 40-50% OF SAMPLE POPULATION OF INSERVICE TEACHERS (N = 49).